

Service Manual

Cassette Deck

RS-M65

FG Servo Controlled Direct-Drive Flat Type Cassette Deck

(Black Face)
(Silver Face)

This is the Service Manual for the following areas.

- For All European areas except United Kingdom.
- For United Kingdom.
- For Asia, Latin America, Middle East and Africa areas.
- For Australia.
- For PX.

RS-M85 MECHANISM SERIES

Specifications

Power requirements:	AC; 110/125/220/240V, 50-60Hz (not necessary For conversion)	Fast forward and rewind time:	Approx. 80 seconds with C-60 cassette tape
	Preset power voltage: 220V for Europe except England, 240V for England and Australia	Inputs:	MIC; sensitivity 0.25mV, input impedance 47K Ω applicable microphone impedance 400 Ω ~ 10K Ω
Power consumption:	30W (for All European areas and Australia) 27W (for Asia, Latin America, Middle East, Africa areas PX)	Output:	LINE; sensitivity 60mV, input impedance 56K Ω LINE; output level 700mV, load impedance 22K Ω over
Motors:	2-motor system Brushless FG servo controlled direct-drive motor for capstan drive	Rec/pb connection:	5P DIN type; input sensitivity 0.25mV, impedance 6.4K Ω , output level 700mV, impedance 1.5K Ω
Track system:	4-track 2-channel stereo recording and playback	Heads:	2-head system 1-SX (Sendust Extra) head for record/playback 1-double-gap ferrite head for erasure
Tape speed:	4.8cm/s (1-7/8ips)	Bias frequency:	85kHz
Wow and flutter:	0.035% (WRMS), $\pm 0.10\%$ (DIN)	Dimensions:	43cm(W) $\times$ 9.7cm(H) $\times$ 34.7cm(D) [16-7/8"(W) $\times$ 3-7/8"(H) $\times$ 13-5/8"(D)]
Frequency response:	CrO ₂ /Fe-Cr tape; 20~18,000Hz 30~18,000Hz (DIN) 30~16,000Hz ± 3 dB Normal tape; 20~16,000Hz 30~16,000Hz (DIN) 30~14,000Hz ± 3 dB	Weight:	7.1kg (15lbs 11oz)
Signal-to-noise ratio:	Dolby* NR in; 69dB Above 5kHz) Dolby NR out; 59dB (signal level = max. recording level, Fe-Cr/ CrO ₂ type tape)		

Specifications are subject to change without notice.

* 'Dolby' and the double-D symbol are trademarks of Dolby Laboratories.

Technics

Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

LOCATION OF CONTROLS AND COMPONENTS

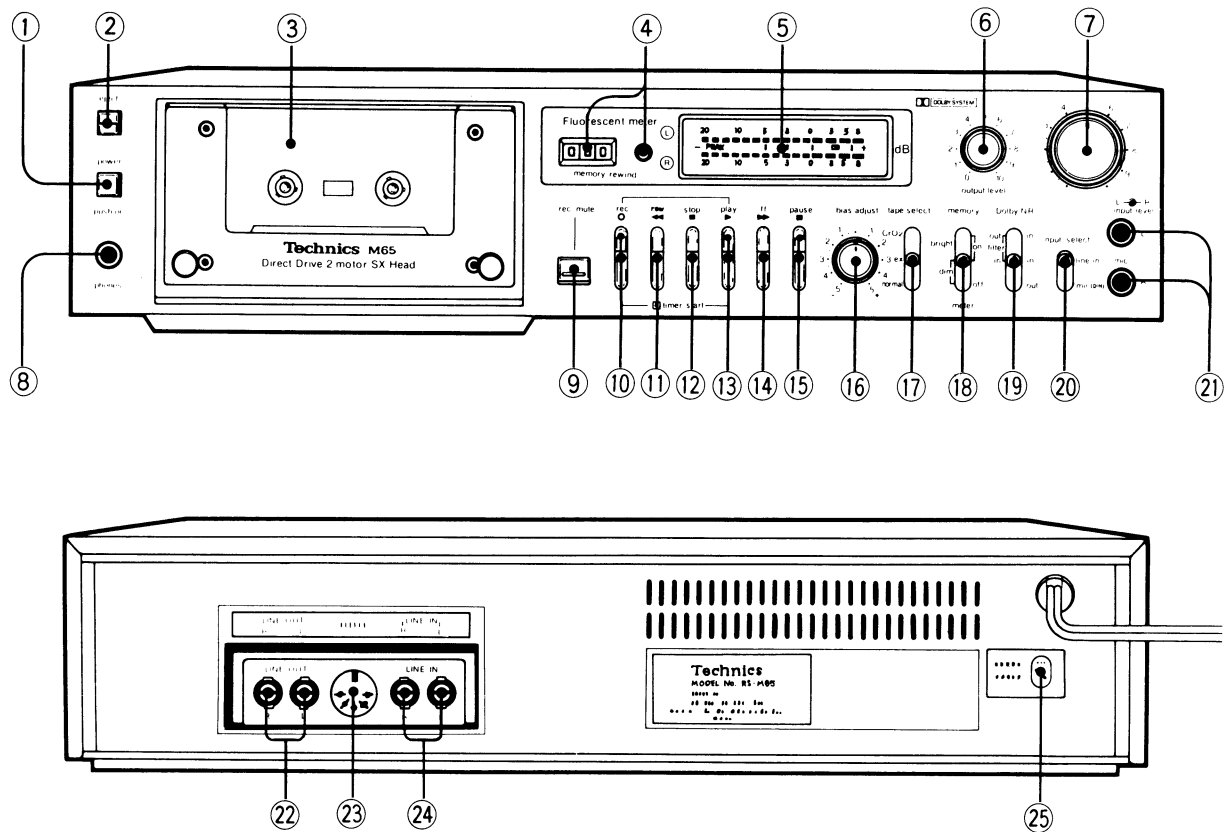


Fig. 1

- | | |
|---|---|
| ① Power switch | ⑭ Fast-forward button |
| ② Eject button | ⑮ Pause button with pause indication lamp |
| ③ Cassette holder | ⑯ Bias-adjustment control |
| ④ Tape counter and reset button | ⑰ Tape selector |
| ⑤ FL (Fluorescent Level) Meters | ⑱ Memory/meter-brightness switch |
| ⑥ Output level control | ⑲ Dolby noise-reduction switch |
| ⑦ Input level controls | ⑳ Input selector |
| ⑧ Headphones jack | ㉑ Microphone jacks |
| ⑨ Record-muting switch | ㉒ Line output jacks |
| ⑩ Record button with record indication lamp | ㉓ Record/playback connection socket |
| ⑪ Rewind button | ㉔ Line input jacks |
| ⑫ Stop button | ㉕ Voltage selector |
| ⑬ Playback button with playback indication lamp | |

DISASSEMBLY INSTRUCTIONS

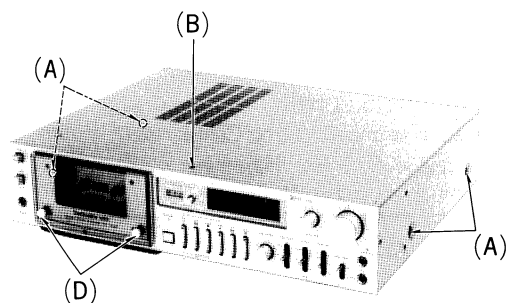


Fig. 2

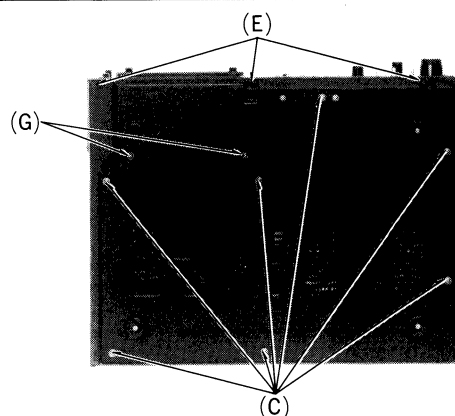


Fig. 3

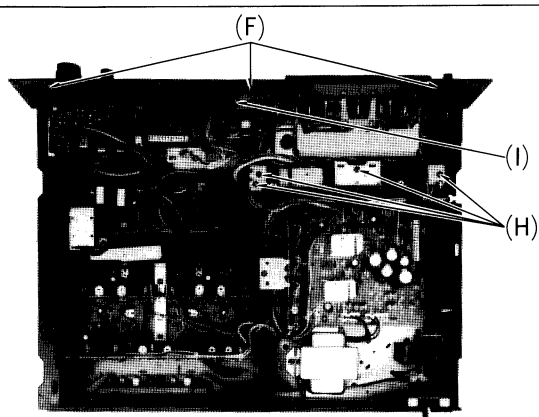


Fig. 4

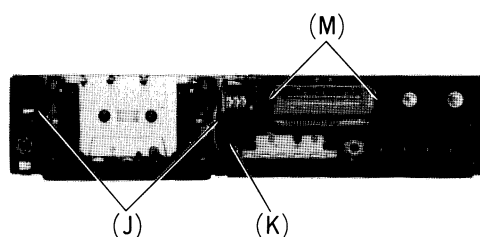


Fig. 5

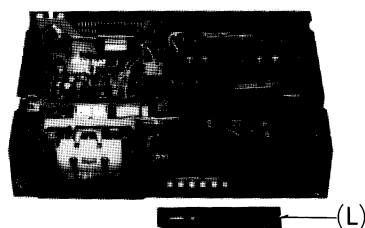


Fig. 6

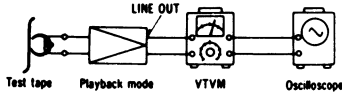
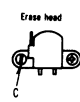
Procedure	To remove —.	Remove —.	Shown in fig. —.
1	Case cover	• 4 screws(A) • 1 screw(B)	2 2
2	Bottom cover	• 7 red screws(C)	3
3	Front panel	• 2 cassette lid holding screws(D)※ • 3 screws(E) • 3 red screws(F)	2 3 4
4	Mechanism	• 2 red screws(G) • 4 red screws(H) • Red screw(I) • 2 red screws(J) • Metal screw(K)	3 4 4 5 5
5	FL level meter	• Meter cover(L) • 2 meter holders(M)	6 5

※ The head azimuth can be adjusted by removing the cassette lid.

MEASUREMENT AND ADJUSTMENT METHODS

NOTE:

1. Make sure heads are clean.
2. Make sure capstan and pressure roller are clean.
3. Judgeable room temperature: $20 \pm 5^{\circ}\text{C}$ ($68 \pm 9^{\circ}\text{F}$)
4. Meter selector: Peak, dim
5. Dolby NR switch: OUT
6. Tape selector: Normal
7. Input selector: Line in
8. Bias adjustment control: Center
9. Output level control: Maximum
10. Input level control: Maximum

ITEM	MEASUREMENT & ADJUSTMENT
Takeup tension Condition: • Playback mode Equipment: • Cassette torque meter ... QZZSRKCT	1. Mount cassette torque meter on UNIT. 2. Place UNIT into playback mode and read takeup torque. 3. Measure several times and determine the mean value. Standard value: $45 \pm 15 \text{ gr-cm}$ Adjustment method If measured value is not standard, adjust VR601.
Head azimuth adjustment Condition: • Playback mode Equipment: • VTVM • Oscilloscope • Test tape (azimuth) ... QZZCFM • Tape path viewer ... QZZCRD	Record/playback head adjustment 1. Test equipment connection is shown in fig. 8. 2. Playback azimuth tape (QZZCFM 8kHz). 3. Adjust record/playback head angle adjustment screw (B) in fig. 9 so that output level at LINE OUT becomes maximum. 4. Measure both channels, and adjust levels for equal output. 5. After adjustment lock head adjustment screw with lacquer. Erase head adjustment 1. Test equipment connection is the same above but use the tape path viewer (QZZCRD) instead of test tape (QZZCFM). 2. Playback this tape. 3. Adjust screw (C) shown in fig. 10 so that the tape may not get curled or malformed by tape guide of the erase head. 4. After adjustment, lock head adjust screw with lacquer.  Fig. 8  Fig. 9  Fig. 10
Tape speed Condition: • Playback mode Equipment: • Digital electronic counter • Test tape ... QZZCWAT	Tape speed accuracy 1. Test equipment connection is shown in fig. 11. 2. Playback test tape (QZZCWAT 3,000Hz), and supply playback signal to frequency counter. 3. Measure this frequency. 4. On the basis of 3,000Hz, determine value by following formula: $\text{Tape speed accuracy} = \frac{f - 3,000}{3,000} \times 100 (\%)$ where, f = measured value 5. Take measurement at middle section of tape. Standard value: $\pm 0.4\%$ Adjustment method 1. Playback the test tape (middle). 2. Adjust tape speed adjustment VR701 so that frequency becomes 3,000Hz. Tape speed fluctuation Make measurements in same manner as above (beginning, middle and end of tape), and determine the difference between maximum and minimum values and calculate as follows: $\text{Tape speed fluctuation} = \frac{f_1 - f_2}{3,000} \times 100 (\%)$ f_1 = maximum value, f_2 = minimum value Standard value: Less than 0.3%

ITEM	MEASUREMENT & ADJUSTMENT
Capstan motor circuit adjustment	Standard DC power supply voltage adjustment 1. Measure the DC voltage between ⑤ terminal of IC701 and ground as shown in fig. 12. Standard value: $11 \pm 0.05 \text{ V}$ 2. If measured voltage is not within standard, adjust VR702. Fig. 12
Playback frequency response Condition: * Playback mode * Output level control ... MAX Equipment: * VTVM * Oscilloscope * Test tape ... QZZCFM	1. Test equipment connection is as same as "Head azimuth adjustment" but use the test tape (QZZCFM) instead of head azimuth tape (See fig. 8). 2. Place UNIT into playback mode. 3. Playback the frequency response test tape (QZZCFM). 4. Measure output level at 12.5kHz, 8kHz, 4kHz, 1kHz, 250Hz, 125Hz and 63Hz, and compare each output level with the standard frequency 315Hz, at LINE OUT. 5. Make measurement for both channels. 6. Make sure that the measured value is within the range specified in the frequency response chart. 7. If measured value is not in standard, adjust VR1 (L-CH), VR2 (R-CH) (See fig. 24). Playback frequency response chart Fig. 13
Playback gain Condition: * Playback mode * Output level control ... MAX Equipment: * VTVM * Oscilloscope * Test tape ... QZZCFM	1. Test equipment connection is shown in fig. 8. 2. Playback standard recording level portion on test tape (QZZCFM 315Hz), and using VTVM measure the output level at LINE OUT jack. 3. Make measurement for both channels. Standard value: $0.66 \pm 0.05 \text{ V}$
Playback S/N ratio Condition: * Playback mode * Output level control ... MAX Equipment: * VTVM * Oscilloscope * Test tape ... QZZCFM * Empty cassette	1. Test equipment connection is shown in fig. 8. 2. Playback standard recording level test tape (QZZCFM 315Hz) and read output level on VTVM. Refer to "Playback gain adjustment". 3. Place empty cassette (which has been cut) and playback again. 4. Measure noise level at this time using VTVM, and determine ratio of this level to test tape output signal voltage (315Hz). Standard value: Greater than 47 dB
Bias leak Condition: * Record mode * Input level control ... MAX Equipment: * VTVM * Oscilloscope	1. Test equipment connection is shown in fig. 14. 2. Place UNIT into record mode. 3. Adjust trap coils L1 (L-CH), L2 (R-CH), so that measured value become minimum (See fig. 24). 4. Make adjustment for both channels. Fig. 14
Bias current Condition: * Record mode * Bias adjustment control ... Center Equipment: * VTVM * Oscilloscope	1. Test equipment connection is shown in fig. 15. 2. Place UNIT into record mode, and tape selector to normal position. 3. Read voltage on VTVM and calculate bias current by following formula: $\text{Bias current (A)} = \frac{\text{Value read on VTVM (V)}}{10 \Omega}$ Standard value: About 0.40 mA 4. If measured value is not in standard, adjust L1 (L-CH), and L2 (R-CH). 5. Then changing the tape selector to Fe-Cr position measure the bias current. Fig. 15

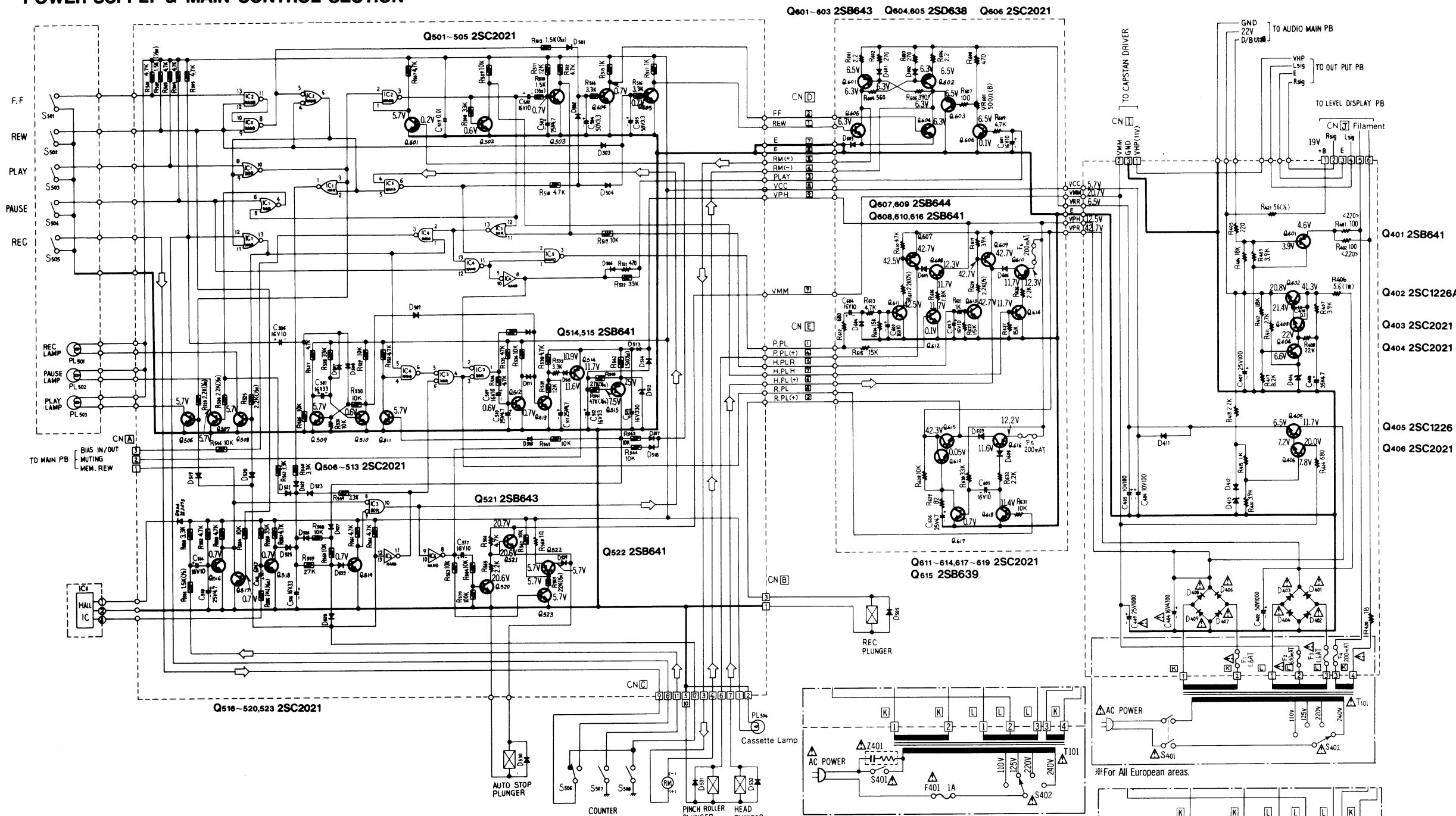
ITEM	MEASUREMENT & ADJUSTMENT
	Standard value: About 0.48 mA 6. Change the tape selector to CrO₂ position, measure the bias current. Standard value: About 0.57 mA
Erase current Condition: * Record mode Equipment: * VTVM * Oscilloscope * Resistor (1Ω)	1. Connect 1Ω resistor between ground side terminal of erase head ground lead wire removed (See fig. 16). 2. Connect VTVM to both ends of 1Ω resistor. 3. Place UNIT into record mode, and measure voltage across the 1Ω resistor. 4. Determine erase current with the following formula: $\text{Erase current (A)} = \frac{\text{Voltage across both ends of } 1\Omega}{1\Omega}$ Standard value: 60 ± 15 mA (bias selector ... low) Fig. 16 Fig. 17
Overall gain Condition: * Record/playback mode * Input level control ... MAX * Standard input level: MIC - 72 ± 3 dB LINE IN ... - 24 ± 3 dB DIN - 36 ± 3 dB * Bias adjustment control ... Center * Output level control ... MAX Equipment: * AF oscillator * VTVM * Oscilloscope * ATT * Test tape (reference blank tape) ... QZZCRA for Normal ... QZZCRX for CrO ₂ ... QZZCRY for Fe-Cr	1. Test equipment connection is shown in fig. 18. 2. Place UNIT into record mode. 3. Supply 1kHz signal (-24 dB) from AF oscillator, through ATT to LINE IN. 4. Adjust ATT until monitor level at LINE OUT becomes 0.66 V. 5. Using test tape, make recording. 6. Playback recorded tape, and measure the output level at LINE OUT on VTVM. 7. If the measured value increases, connection points for R93, R94 (Fe-Cr) or R97, R98 (CrO₂) should be shorted. 8. If the measured value decreases, connection points for R91, R92 (Fe-Cr) or R95, R96 (CrO₂) should be unsoldered. Standard value: 0.66 ± 0.05 V (Normal position), 0.66 ± 1.5 dB (Fe-Cr position, CrO₂ position) Fig. 18
Fluorescent meter Condition: * Record mode * Input level control ... MAX * Output level control ... MAX * Tape selectors ... Normal position Equipment: * VTVM * AF oscillator * ATT	1. Test equipment connection is shown in fig. 18. 2. Set the meter function selector to the "bright" position. 3. Supply 1kHz signal (-24 dB) to the LINE IN jack, then press the record button. 4. Adjust the ATT so that the output level at LINE OUT jack becomes 0.66 V (= standard input level). 5. Adjustment at "0 dB": A. Adjust VR301 (L-CH) and VR302 (R-CH) so that the Fluorescent meters show an illuminated indication up to "0 dB" when the input signal level is 0.9 dB higher than the standard input level. B. Then confirm that the Fluorescent meters show an illuminated indication up to "+1 dB" when the input signal level is 1 dB higher than the standard input level. 6. Adjustment at "-20 dB": A. Adjust VR303 (L-CH) and VR304 (R-CH) so that the Fluorescent meters show an illuminated indication up to "-20 dB" when the input signal level is 15.1 dB lower than the standard input level. B. Then confirm that the Fluorescent meters show an illuminated indication up to "-15 dB" when the input signal level is 15 dB lower than the standard input level. 7. Repeat twice between steps 3 and 6 above. Fig. 19 Fig. 20

SCHEMATIC DIAGRAM

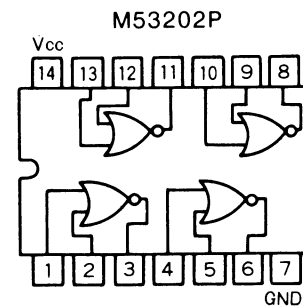
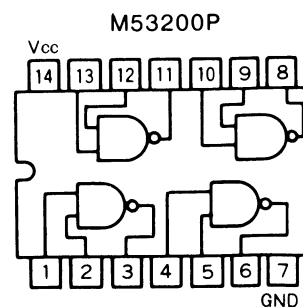
POWER SUPPLY & MAIN CONTROL SECTION

NOTE: RESISTORS
ERG Carbon
ERD Metal-oxide
ERO Metal-film
ERX Metal-film
ERQ Fuse type metallic
ERC Solid
ERF Cement

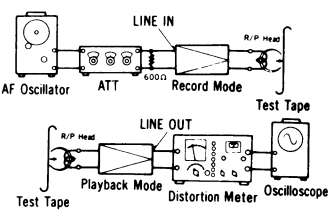
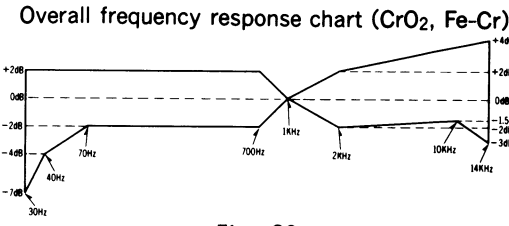
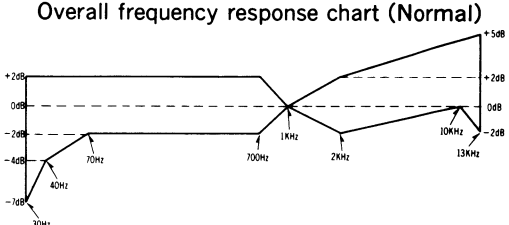
CAPACITORS
ECG Ceramic
ECK Ceramic
ECC Ceramic
ECF Ceramic
ECQW Polyester
ECQE Polyester
ECQF Polypropylene
ECE Electrolytic
ECEN Non polar electrolytic
EQS Polystyrene
ECS Tantalum



- NOTE:
- S501.....Fast forward button switch.
 - S502.....Rewind button switch.
 - S503.....Playback button switch.
 - S504.....Pause button switch.
 - S505.....Record button switch.
 - S506.....Accidental erase prevention switch.
 - S507.....Counter switch.
 - S508.....Cassette detection switch.
 - S401.....Power ON/OFF switch.
 - Resistor values are in ohms (Ω), 1/4 watt unless specified otherwise.
 - Values of R401 and R402 indicated in $\langle \rangle$ are used for All European areas.
 - Capacitor values are in microfarads (μ F) unless specified otherwise.
 - P=Pico-farads.
 - All voltage values shown in circuitry are under no signal condition with volume control at minimum position.
 - For measurement, use VTVM.
 - F5, F6 are used for All European areas.
 - W indicates printed resistor.



Ref. No.	Part No.	Ref. No.	Part No.
RESISTORS			
R1, 2	ERD25TJ682	R132	ERD25TJ472
R3, 4	ERD25TJ100	R133	ERD25TJ821
R5, 6	ERD25TJ104	R134	ERD25TJ332
R7, 8	ERD25TJ563	R135, 136, 137, 138	ERD25TJ472
R9, 10	ERD25TJ101	R201, 202	ERD25TJ154
R11, 12	ERD25TJ224	R203, 204	ERD25TJ104
R13, 14	ERD25TJ471	R205, 206	ERD25TJ273
R15, 16	ERD25TJ224	R207, 208	ERD25TJ223
R19, 20	ERD25TJ103	R209, 210	ERD25TJ154
R21, 22	ERD25TJ273	R211, 212	ERD25TJ272
R23, 24	ERD25TJ103	R213, 214	ERD25TJ222
R25, 26	ERD25TJ181	R215, 216	ERD25TJ274
R27, 28	ERD25TJ273	R217, 218	ERD25TJ473
R29	ERD25TJ562	R219, 220	ERD25TJ332
R31, 32	ERD25TJ124	R221, 222	ERD25TJ392
R33, 34	ERD25TJ562	R223, 224	ERD25TJ102
R35, 36	ERD25TJ563	R225, 226	ERD25TJ185
R39, 40	ERD25TJ123	R227, 228	ERD25TJ105
R41, 42	ERD25TJ182	R229, 230	ERD25TJ153
R43, 44	ERD25TJ472	R231, 232	ERD25TJ101
R45, 46	ERD25TJ562	R233, 234	ERD25TJ472
R47, 48	ERD25TJ224	R235, 236	ERD25TJ103
R49, 50	ERD25TJ333	R237, 238, 239, 240	ERD25TJ822
R51, 52	ERD25TJ101	R241, 242	ERD25TJ333
R53, 54	ERD25TJ683	R243, 244	ERD25TJ154
R55, 56	ERD25TJ102	R245, 246	ERD25TJ333
R57, 58	ERD25TJ101	R247, 248	ERD25TJ272
*For Asia, Latin America, Middle East, Africa areas, Australia and P.X.			
*For All European areas.			
R59, 60	ERD25TJ104	R249, 250	ERD25TJ102
R61, 62	ERD25TJ102	R251, 252	ERD25TJ560
R63, 64	ERD25TJ104	R253, 254	ERD25TJ820
R65, 66	ERD25TJ562	R255, 256	ERD25TJ153
R67, 68	ERD25TJ471	R257, 258	ERD25TJ274
R69, 70	ERD25TJ103	R259, 260	ERD25TJ224
R71, 72	ERD25TJ224	R261, 262	ERD25TJ822
R73, 74	ERD25TJ473	R263, 264	ERD25TJ222
R75, 76	ERD25TJ563	R265	ERD25TJ274
R77, 78	ERD25TJ562	R266	ERD25TJ274
R79, 80	ERD25TJ153	R301, 302	ERD25TJ223
R81, 82	ERD25TJ332	R303, 304	ERD25TJ333
R83, 84	ERD25TJ333	R305, 306	ERD25TJ473
R85, 86	ERD25TJ332	R307, 308	ERD25TJ154
R87, 88	ERD25TJ103	R309, 310	ERD25TJ223
R89, 90	ERD25TJ822	R311, 312	ERD25TJ102
R91, 92, 93, 94	ERD25TJ273	R313, 314	ERD25TJ221
R95, 96	ERD25TJ123	R315, 316	ERD25TJ823
R97, 98	ERD25TJ563	R318	ERD25TJ822
R99, 100	ERD25TJ473	R320	ERD25TJ681
R101, 102	ERD25TJ392		
R103, 104	ERD25TJ224		
R105, 106	ERD25TJ333		
R107	ERD25TJ152		
R108	ERD25TJ821		
R109, 110	ERD25TJ562		
R111, 112	ERD25TJ821		
R113, 114	ERD25TJ220		
R115, 116	ERD25TJ821		
R117, 118	ERD25TJ222		
R119, 120	ERD25TJ472		
R121, 122	ERD25TJ104		
R123, 124	ERD25TJ152		
R125	ERD25TJ682		
R126	ERD25TJ473		
R129	ERD25TJ822		
R130	ERD25TJ183		
R131	ERD25TJ222		

ITEM	MEASUREMENT & ADJUSTMENT
Overall distortion Condition: * Input level control ... MAX * Output level control ... MAX * Bias adjustment control ... Center Equipment: * Distortion meter * AF oscillator * ATT * Oscilloscope * Test tape (reference blank tape) ... QZZCRA	1. Test equipment connection is shown in fig. 21. 2. Supply 1kHz signal to LINE IN and adjust ATT so that output level at LINE OUT indicates 0.66 V (−4 dB). 3. Make recording. 4. Playback and measure distortion factor of output signal. 5. When the distortion factor does not satisfy the standard, check the bias current. When the bias current is lower than the standard, distortion will increase. Care should be exercised in the adjustment because the bias current also has an influence on the overall frequency response. Refer to “The overall frequency response” and “The bias current adjustment”.  Standard value: Less than 3.5%
Overall frequency response Condition: * Record/playback mode * Input level control ... MAX * Output level control ... MAX * Bias adjustment control ... Center Equipment: * VTVM * AF oscillator * ATT * Test tape (reference blank tape) ... QZZCRA for Normal ... QZZCRX for CrO ₂ ... QZZCRY for Fe-Cr	Note: Before measuring and adjusting, make sure of the playback frequency response (For the method of measurement, please refer to the playback frequency response). 1. Test equipment connection is shown in fig. 18. 2. Load reference blank test tape and place UNIT into record mode. 3. Supply 1kHz signal from AF oscillator through ATT to LINE IN. 4. Adjust ATT so that input level is −20 dB below standard recording level (standard recording level = 0 VU). 5. At this time, LINE OUT level indicates 0.066 V. 6. Record each frequency 30Hz, 40Hz, 70Hz, 700Hz, 1kHz, 2kHz, 7kHz, 10kHz and 13.5kHz (16kHz for CrO₂ and Fe-Cr) at the same level. 7. Playback and express in dB the difference between playback output level of each frequency based on playback output level of 1kHz. 8. Make sure that the measured value is within the range specified in the overall frequency response chart. 9. If the measured value decreases at high frequency range, connection points for C5 (L-CH), C6 (R-CH) should be shorted to increase at high frequency range. 
Dolby NR circuit Condition: * Record mode * Input level control ... MAX Equipment: * VTVM * AF oscillator * ATT * Oscilloscope	1. Place UNIT into record mode, set the Dolby NR switch to OUT position and supply to LINE IN to obtain −34.5 dB at TP (L-CH), TP (R-CH) (frequency 5 kHz). 2. Confirm that the value at IN position is 8 dB greater than the value at OUT position of Dolby NR switch. 3. When it is not in condition above, adjust as follows. 4. Set the VR201 (L-CH), VR202 (R-CH) to maximum. 5. Set the Dolby NR switch to IN position. 6. At this time adjust VR203 (L-CH), VR204 (R-CH) so that the reading of VTVM becomes 10 dB greater than the value in step (1) above. 7. Adjusting VR201 (L-CH), VR202 (R-CH) make the reading of VTVM become 2 dB smaller than the value obtained through the adjustment in step (6) above.

ITEM	MEASUREMENT & ADJUSTMENT
Overall S/N ratio Condition: * Record/playback mode * Input level control ... MAX * Erase the tape with a bulk tape eraser. * Output level control ... MAX * Bias adjustment control ... Center Equipment: * VTVM * AF oscillator * ATT * Oscilloscope * Test tape (reference blank tape) ... QZZCRA	1. Test equipment connection is shown in fig. 18. 2. Supply 1kHz signal to LINE IN and adjust ATT so that output level at LINE OUT indicates 0.66 V. 3. Make recording. 4. Make another recording without supplying signal (disconnect input plug to LINE IN). 5. Rewind to recorded part and playback. 6. Measure output signal level and no signal level (noise), and determine the ratio in decibels (dB). 7. The value is difference between “Playback S/N and overall S/N”, but for decibel calculation refer to “Playback S/N ratio”. Standard value: Greater than 45 dB (without NAB filter)

ADJUSTMENT PARTS LOCATION

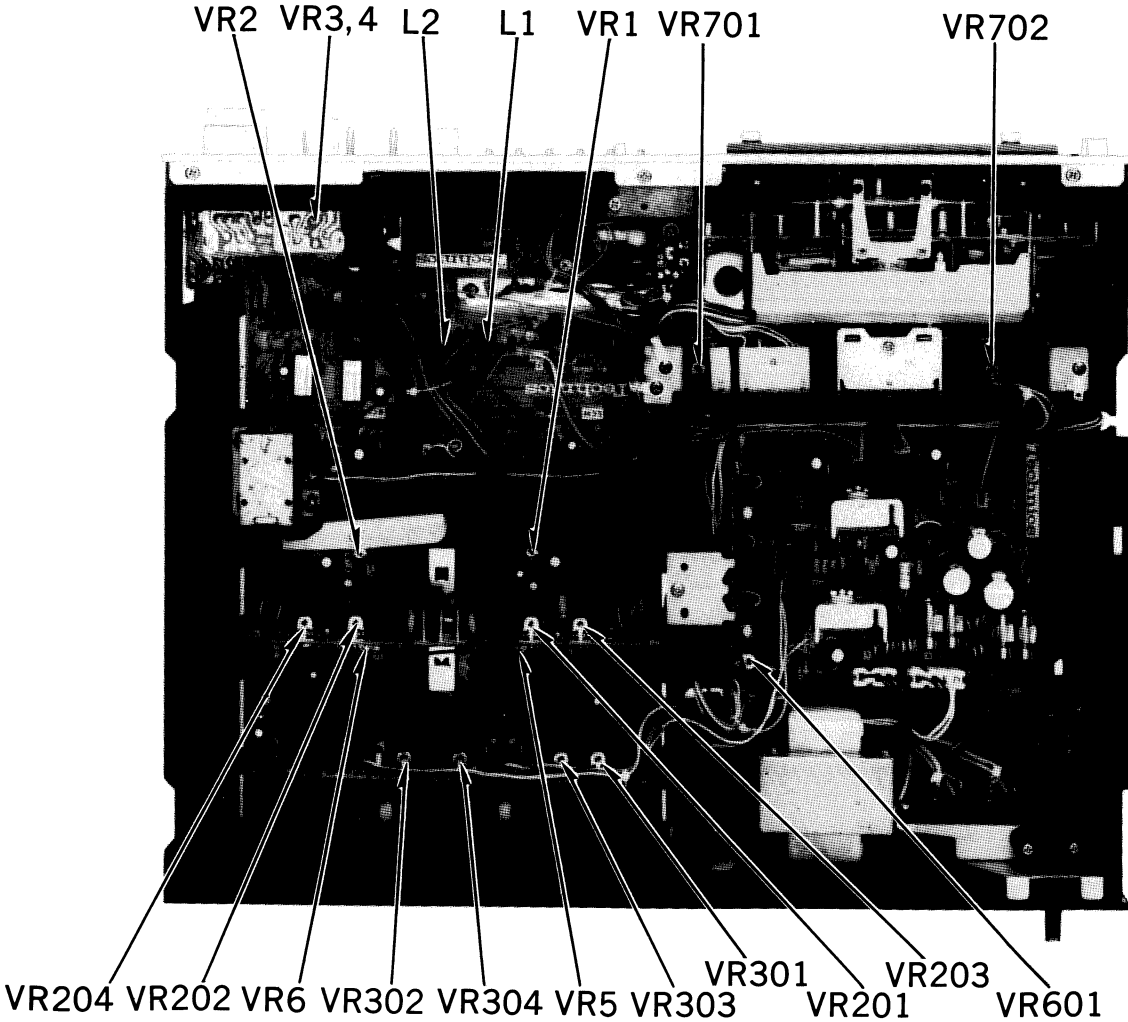
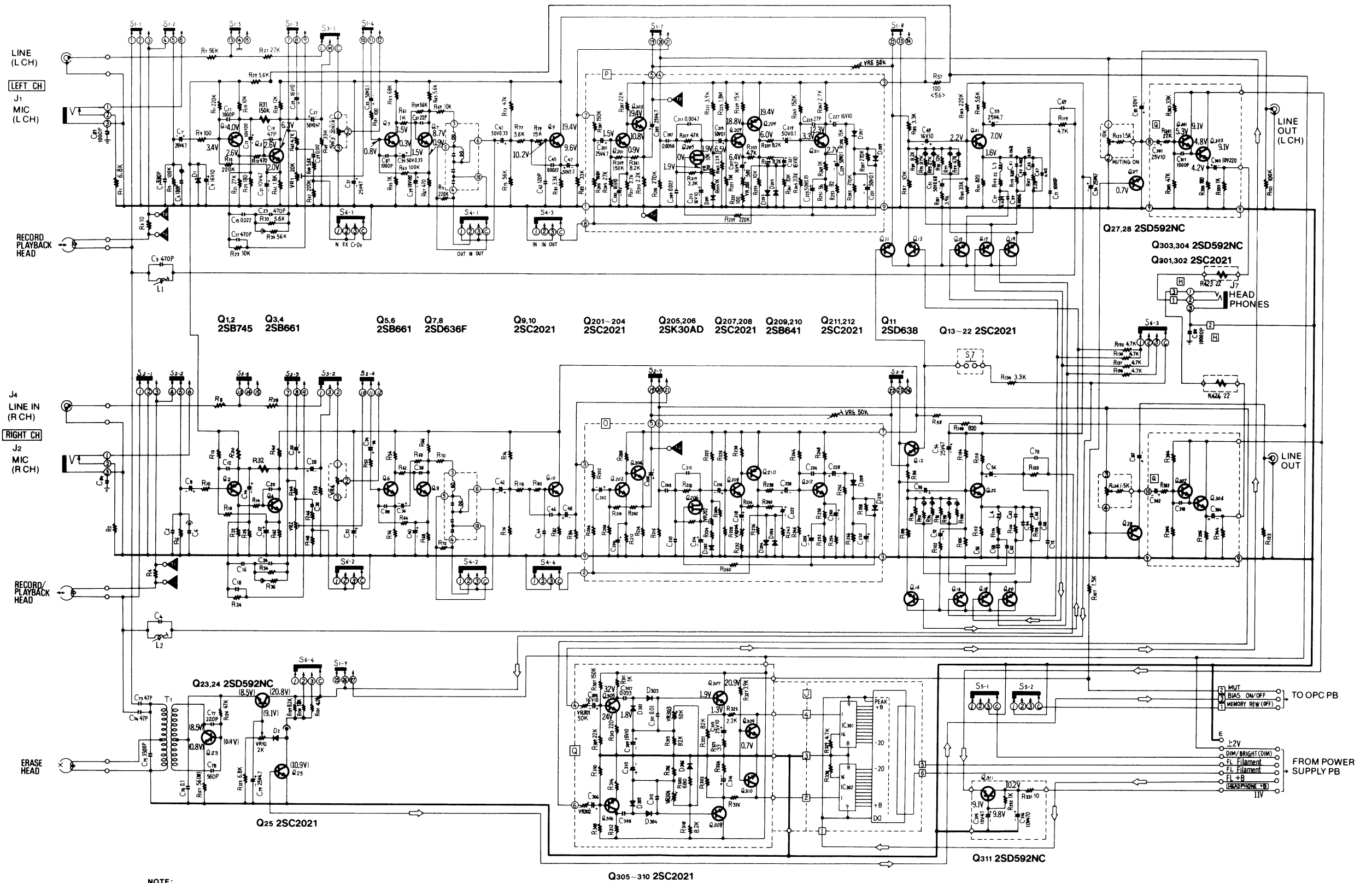


Fig. 24

SCHEMATIC DIAGRAM



NOTE:

1. S1-1~S1-8 Record/playback select switch L-CH (shown in playback position).
2. S2-1~S2-9 Record/playback select switch R-CH (shown in playback position).
3. S3-1, S3-2 Input select switch (L---LINE IN, M---MIC).
4. S4-1~S4-4 Dolby NR switch (shown in "OUT" position).
1...Filter-OUT/IN, 2...Filter-IN/IN, 3...Filter-OUT/OUT.
5. S5-1, S5-2 Memory rewind switch/meter brightness select switch (shown in memory rewind OFF/meter brightness DIM position).
1...Memory rewind OFF/DIM, 2...Memory rewind ON/DIM,
3...Memory rewind ON/BRIGHT.

- 6. S6-1, S6-2 Tape select switch (shown in "Normal" position).
 1 - Normal, 2 - Fe-Cr, 3 - CrO2
- 7. S7 Muting switch for record and playback.
- 8. VR1, 2 Playback level adjustment VR.
- 9. VR3, 4 Input level control.
- 10. VR5, 6 Recording level adjustment VR.
- 11. VR7, 8 Output level control.
- 12. VR10 Bias control adjustment VR.
- 13. VR301, 302 Fluorescent meter adjustment VR (for 0dB).
- 14. VR303, 304 Fluorescent meter adjustment VR (for -20dB).

15. L1, 2 Bias leakage adjustment coil.
16. L3, 4 Recording equalizer coil.
17. Resistor values are in ohms (Ω), 1/4 watt unless specified otherwise.
K = 1,000 Ω .
18. Values of R57 and R58 indicated in (< >) are used for All European areas.
19. Capacitor values are in microfarads (μ F) unless specified otherwise.
P = Pico-farads.
20. All voltage values shown in circuitry are under no signal condition with volume control at minimum position.
For measurement, use VTVM.
21.  indicates printed resistor.

NOTE: Δ indicates that only parts specified by the manufacturer be used for safety.

Ref. No.	Part No.	Ref. No.	Part No.
R321, 322	ERD25TJ823	R609, 610	ERD25TJ472
R323, 324	ERD25TJ330	R611	ERG12ANJ222
R325, 326	ERD25TJ222	R612	ERD25TJ681
R327	ERD25TJ392	R613	ERD25TJ472
R329, 330	ERD25TJ472	R614, 615	ERD25TJ153
R331	ERD25TJ100	R616	ERD25TJ182
R332, 333, 334	ERD25TJ102	R619	ERD25TJ392
R335, 336	ERD25TJ101	R620	ERG12ANJ222
R401, 402	ERD25TJ101	R621	ERD25TJ102
*For Asia, Latin America, Middle East, Africa areas, Australia and PX.	ERD25TJ221	R622	ERD25TJ153
*For All European areas.	ERD25TJ392	R626	ERD25TJ222
R403	ERD25TJ392	R627	ERD25TJ153
R404	ERD25TJ183	R628	ERD25TJ103
R405	ERD25TJ221	R629	ERD25TJ820
R406	ERX1ANJ5R6	R630	ERD25TJ333
R407	ERD25TJ392	R631	ERD25TJ103
R408	ERD25TJ223	R632	ERD25TJ222
R411	ERD25TJ272	R701	ERD25TJ183
R412	ERD25TJ183	R702	ERD25TJ153
R413	ERD25TJ822	R703	ERD25TJ822
R414, 415	ERD25TJ681	R704	ERD25TJ392
R416	ERD25TJ392	R705	ERD25TJ104
R417	ERD25TJ222	R706	ERD25TJ103
R418	ERD25TJ183	R707	ERD25TJ273
R419	ERD25TJ222	R708	ERD25TJ471
R420	ERD25TJ180	R709	ERD25TJ102
R421	ERG12ANJ560	R710	ERX12ANJ1R8
R423, 424	ERD25TJ220	R711	ERD25TJ561
R436	ERX1ANJ4R7	R712, 713	ERD25TJ270
R521	ERD25TJ471	R714, 715, 716, 717	ERD25TJ471
R531	ERD25TJ103	R718	ERD25TJ332
R533	ERD25TJ332	R719	ERD25TJ271
R565	ERD25TJ222	R720, 721	ERD25TJ122
R566	ERD25TJ472	R722	ERD25TJ561
R568	ERD25TJ100	R723, 724	ERD25TJ222
R601	ERD25TJ2R2	R725	ERD25TJ102
R602, 603	ERD25TJ271	R726	ERD25TJ562
R604	ERD25TJ2R2	R727	ERD25TJ332
R605	ERD25TJ561	VR1, 2	EVNKA4A00B24
R606	ERD25TJ391	VR3, 4	EWKXAF22A24
R607	ERD25TJ101	VR5, 6	EVNKA4A00B54
R608	ERD25TJ471	VR7, 8	EWKXAF22A24
		VR10	EVHM7AF20B23
		VR201, 202	EVNKA4A00B14
		VR203, 204	EVNKA4A00B52

VARIABLE RESISTORS

Ref. No.	Part No.	Part Name & Description
TRANSFORMERS		
T1	QLB0185	Bias Oscillator Transformer
T101	QLPA45EMX	Power Transformer
*For United Kingdom, Asia, Latin America, Middle East, Africa areas, Australia and PX.		
	QLPD35EMX	"
*For All European areas except United Kingdom.		
COILS		
L1, 2	QLQX1032W	Coil
L3, 4	QLQX2421Y	"
L5	QLM925K	MPX Filter Coil
SWITCHES		
S1, 2	QSS1204	Record/Playback Select Switch
S3	QST4221	Lever Switch
S4, 5, 6	QST4311	"
S7	EQPAR11K	Key Board Switch
S401	QSW1206AA	Power Switch
*For Asia, Latin America, Middle East, Africa areas and PX.		
	QSW2214A	"
*For All European areas and Australia.		
S402	QSR1407H	AC Power Voltage Select switch
S501, 502, 503, 504, 505	QSWXA01A	Switch
S506	QSM0067	Micro Switch
S507	Refer to M31	Counter Switch
S508	QSB0238	Leaf Switch
PILOT LAMPS		
PL501, 502, 503	XAMQ34S300W	Pilot Lamp
PL504	XAMQ41S500	"

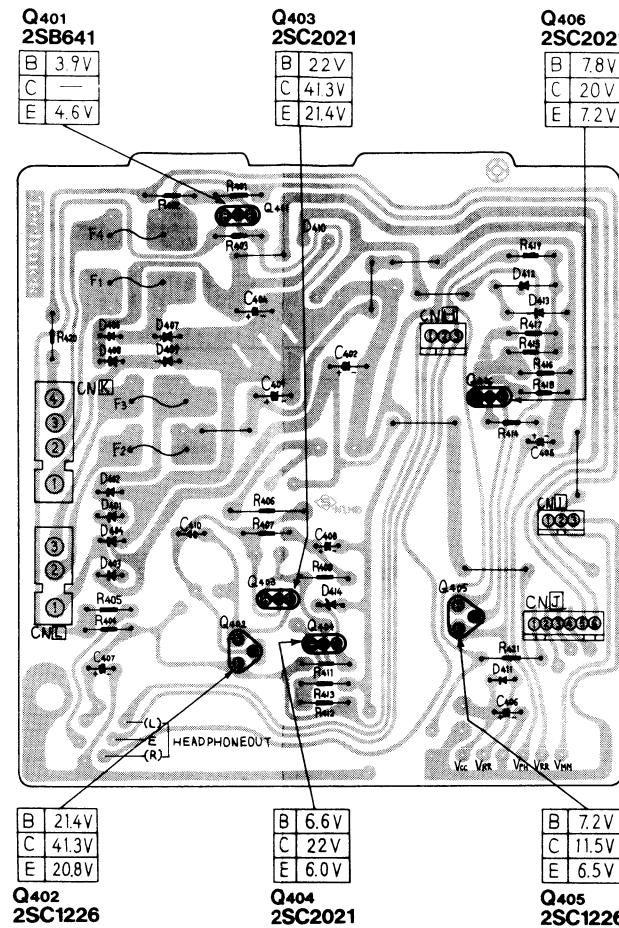
Ref. No.	Part No.	Ref. No.	Part No.
VR301, 302, 303, 304	EVNKA0A00B54	C311, 312	ECQM05103KZ
VR601	EVNKA0A00B52	C313, 314	ECEA1HS100
VR701	EVNKA0A00B53	C315	ECEA1AS470
VR702	EVNKA0A00B13	C316	ECEA1AS471
CAPACITORS			
C1, 2	ECCD1H331K	C401	ECEA1HS471
C3, 4	EQQS1471JZ	C402	ECEA1HS102
C5, 6	ECCD1H181K	C403	ECEA1CS102
C7, 8	ECEA25M4R7	C404	ECEA1AS472
C10	ECEA1HS100	C405, 406	ECEA1AS101
C11, 12	ECQM05102KZ	C407	ECEA1ES101
C13, 14	ECEA10M100	C408	ECEA1HS470
C15, 16	ECQM05223JZ	C409	ECEA1VS102
C17, 18	ECKD1H471KB	C410	ECQM05104MZ
C19, 20	ECCD1H470KC	C502	ECEA1HS100
C21, 22	ECEA1AS470	C503	ECEA25Z4R7
C23, 24	ECKD1H471KB	C504, 505	ECEA5023R3
C25, 26	ECEA1HS100	C506	ECEA16M100
C27, 28	ECEA50MR47	C507	ECEA1CS330
C29, 30	ECQM05123KZ	C509	ECEA1HS100
C31, 32	ECEA1ES470	C510, 511	ECEA1HS100
C33, 34	ECEA50MR1	C512	ECEA25Z4R7
C35, 36	ECEA50ZR33	C513	ECEA1CS330
C37, 38	ECCD1H220KC	C514	ECEA1CS331
C39, 40	ECEA1ES101	C515	ECEA1HS100
C41, 42	ECEA50ZR33	C516	ECEA1CS330
C43, 44	ECCD1H121K	C517	ECEA1HS100
C45, 46	ECQM05122KZ	C518	ECEA25Z4R7
C47, 48	ECEA50Z2R2	C519	ECKD1H103ZF
C49, 50	ECEA1HS100	C601, 602, 603, 604, 605	ECEA1HS100
C51, 52	ECEA50ZR68	C606	ECEA25Z4R7
C54	ECEA1ES470	C701	ECQM05393KZ
C55, 56	ECEA25Z4R7	C702	ECQM05683KZ
C57, 58	ECQM05393JZ	C703	ECQM05104KZ
C59, 60	ECQM05562JZ	C704	ECKD1H471KB
C61, 62	ECQM05683KZ	C705	ECQM05123KZ
C63, 64	ECQM05223KZ	C706	ECQM05182KZ
C65, 66	ECQM05333KZ	C707	ECQM05332KZ
C67, 68	ECQM05103KZ	C708	EQQS1681JZ
C69, 70	ECQM05332KZ	C709	ECQM05223KZ
C71, 72	ECKD1H471KB	C710	ECEA1ES470
C73, 74	ECCD1H470KC	C711	ECQM05473KZ
C75	EQF6332KZ	C712	ECQM05562KZ
C76	ECQM05104MZ	C713	ECQM05473KZ
C77	ECCD1H221K	C714	ECEA50ZR47
C78	EQQS1561JZ	C715	ECQM05123KZ
C79	ECEA25Z4R7	C716	ECEA50ZR1
C81, 82	ECEA50Z1	C717, 718	ECEA50Z1
C83, 84	ECKD1H102KB	C719	ECEA50N1
C85, 86	ECQM05682KZ	C720	ECEA1ES101
C87, 88	ECKD1H102KB		ECKD1H152KB
C201, 202	ECEA25Z4R7	INTEGRATED CIRCUITS	
C203, 204	ECEA1HS100	COMBINATION PARTS	
C205, 206	ECEA25Z4R7	Z1	M53202P
C207, 208	ECQM05562JZ	IC1	M53200P
C209, 210	ECQM05273JZ	IC2	M53202P
C211, 212	ECQM05472JZ	IC3	M53200P
C213, 214	ECEA1HS100	IC4, 5	M53200P
C215, 216	ECEA50MR1	IC6	DN835
C217, 218	ECEA1ES470	IC301, 302	QVIBA658
C219, 220	ECEA50ZR1	IC701	AN660
C221, 222	ECEA1HS100	DIODES	
C223, 224	ECCD1H270KC	D1	MA1051
C225, 226	ECEA50ZR33	D2	1S2473
C227, 228	ECEA1HS100	D201, 202	OA90
C229, 230, 231, 232	ECEA50ZR1	D203, 204, 205, 206	1S2473
C301, 302	ECEA1HS100	D207, 208	OA90
C303, 304	ECEA1AS221	D209, 210	1S2473
C305, 306	ECEA1HS100	D301, 302, 303, 304	OA90
C307, 308	ECQM05333MZ	D306	MV121
C309, 310	ECEA1HS100	D401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411	1S2473
		D412	MA102
		D413	MA1082
		D414	MA1062
		D501, 502, 503, 504	1S2473
		D505	SM102
		D506, 507, 508, 509, 510, 511	1S2473
		D512	MA1075
		D513, 514	SM102

TRANSISTORS

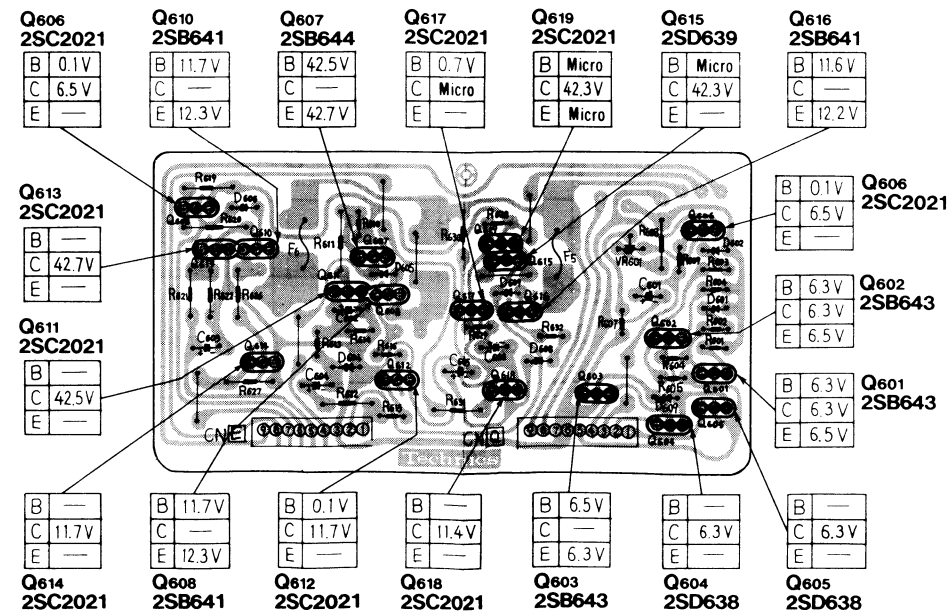
DIODES

RS-M65 RS-M65

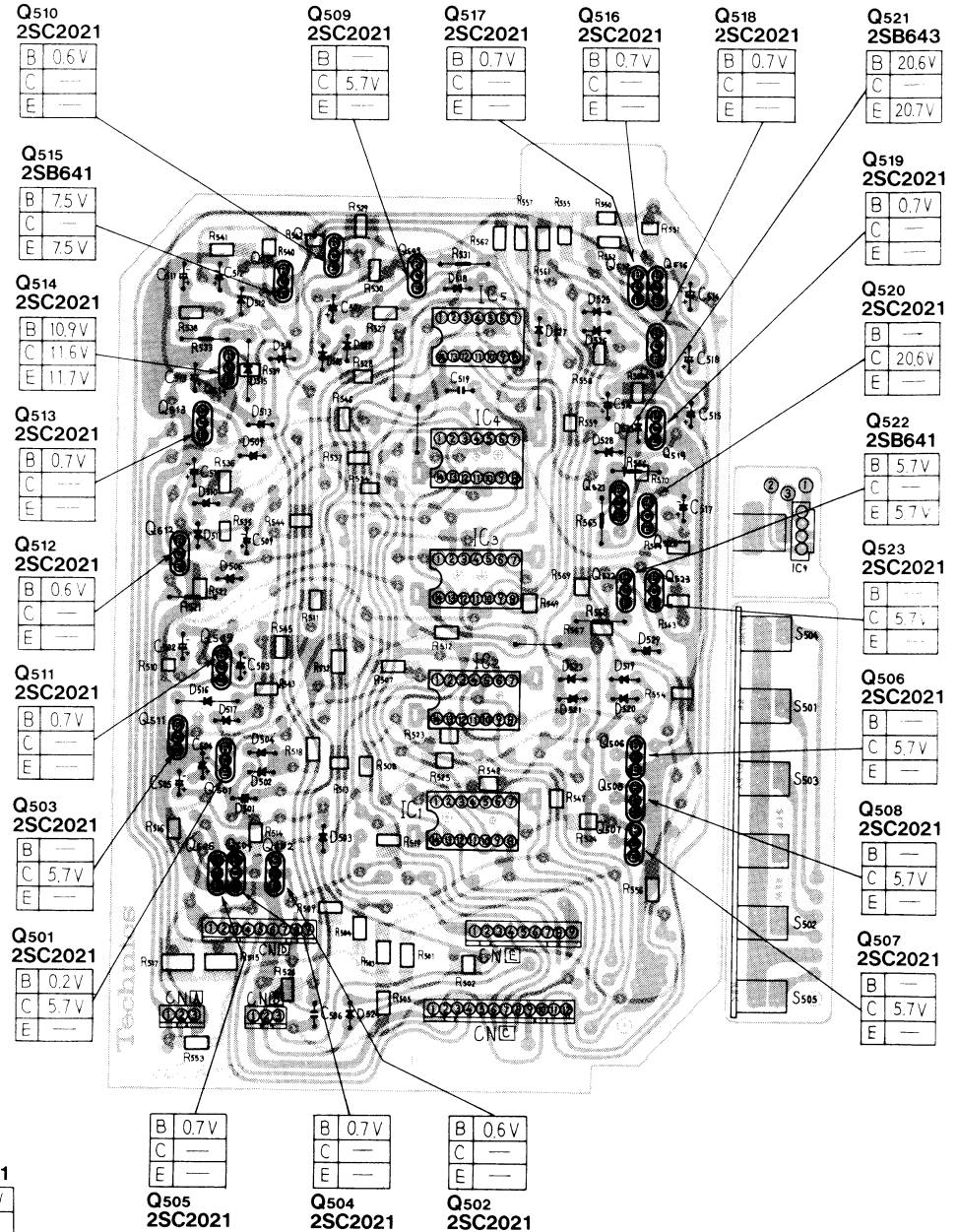
CIRCUIT BOARD POWER SUPPLY CIRCUIT BOARD



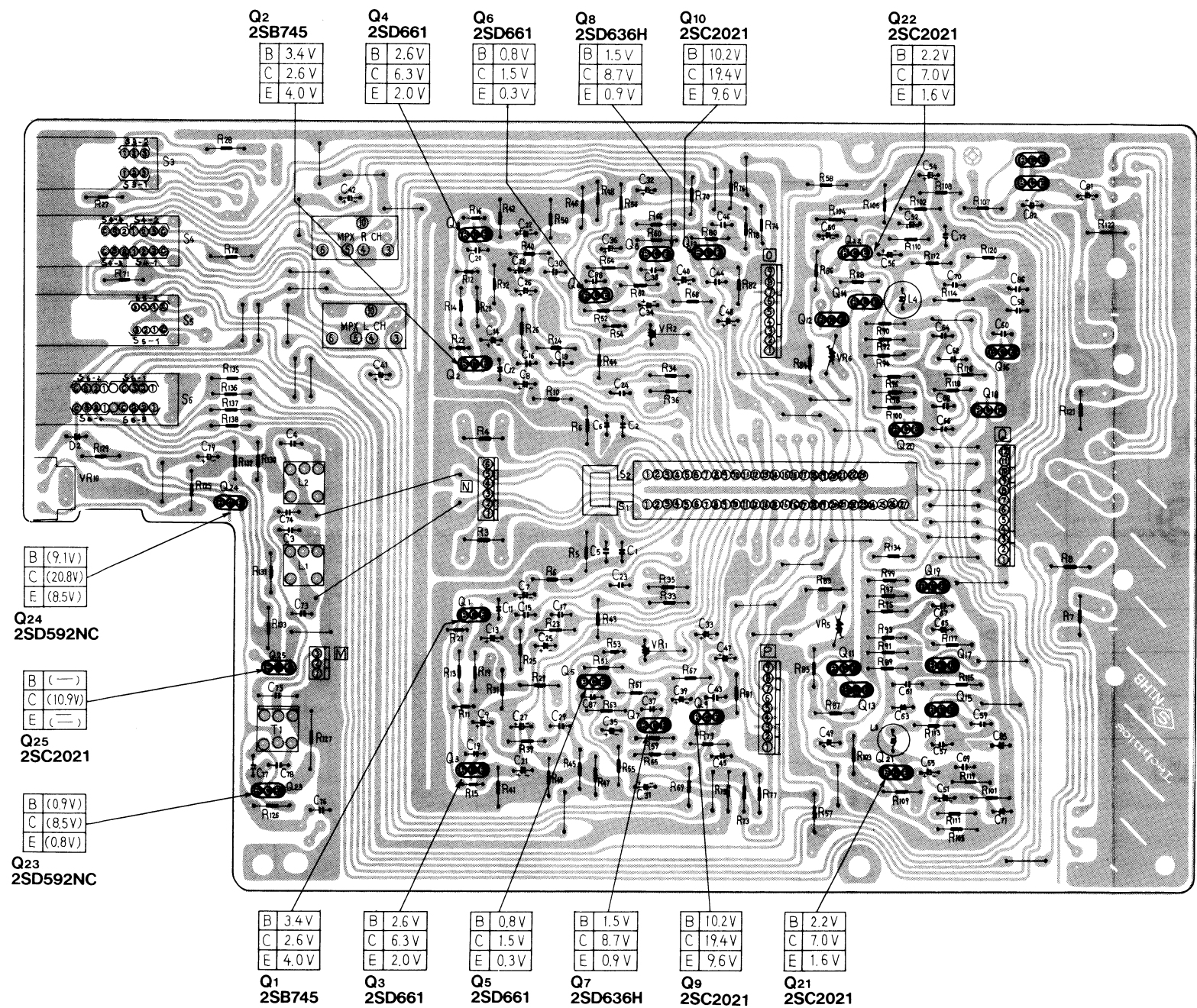
PLUNGER DRIVING CIRCUIT BOARD



MAIN CONTROL CIRCUIT BOARD

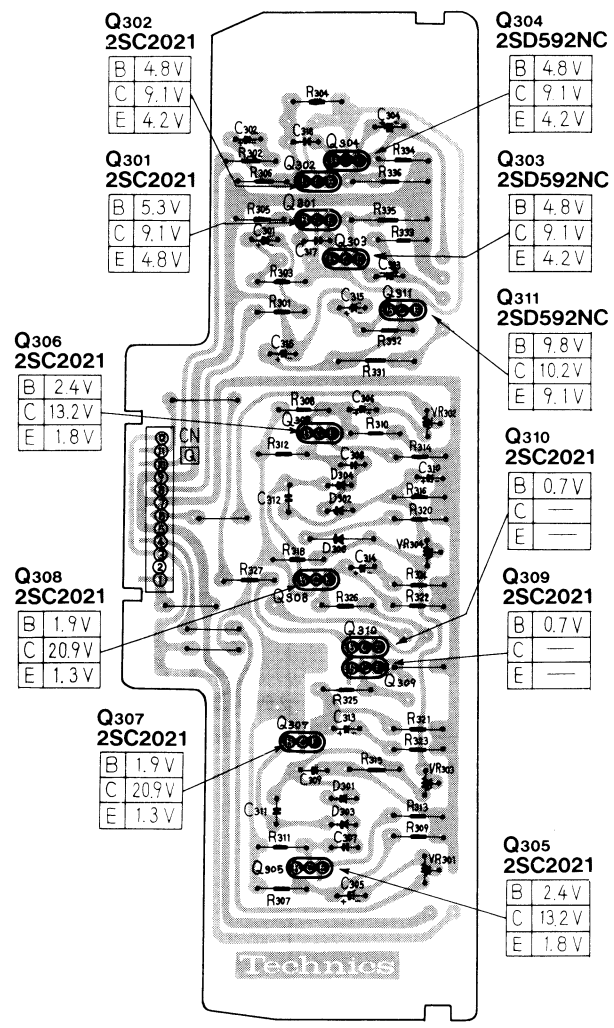


CIRCUIT BOARD
MAIN AMP CIRCUIT BOARD

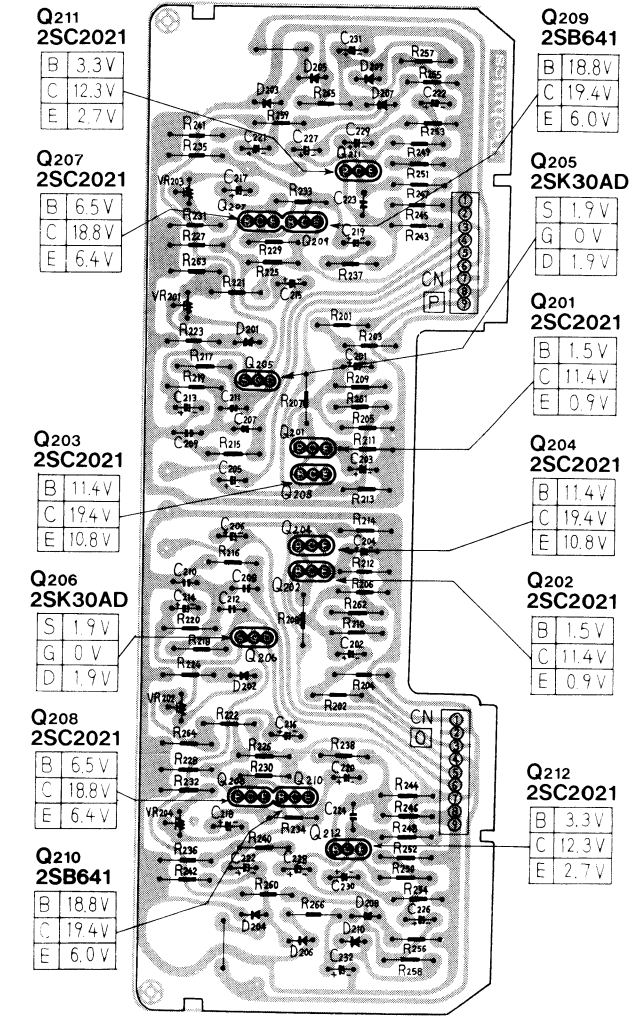


NOTE:
The circuit shown in red on the conductor is B circuit.
Values indicated in are DC voltage between the chassis and electrical parts.

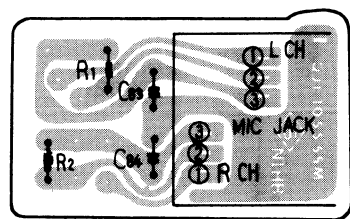
METER OUTPUT CIRCUIT BOARD



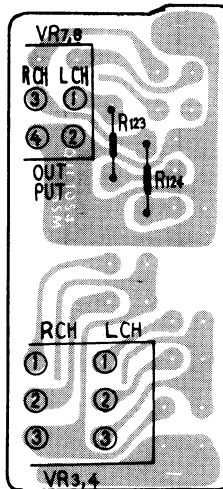
DOLBY CIRCUIT BOARD



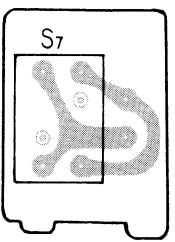
MIC JACK CIRCUIT BOARD



VR CIRCUIT BOARD

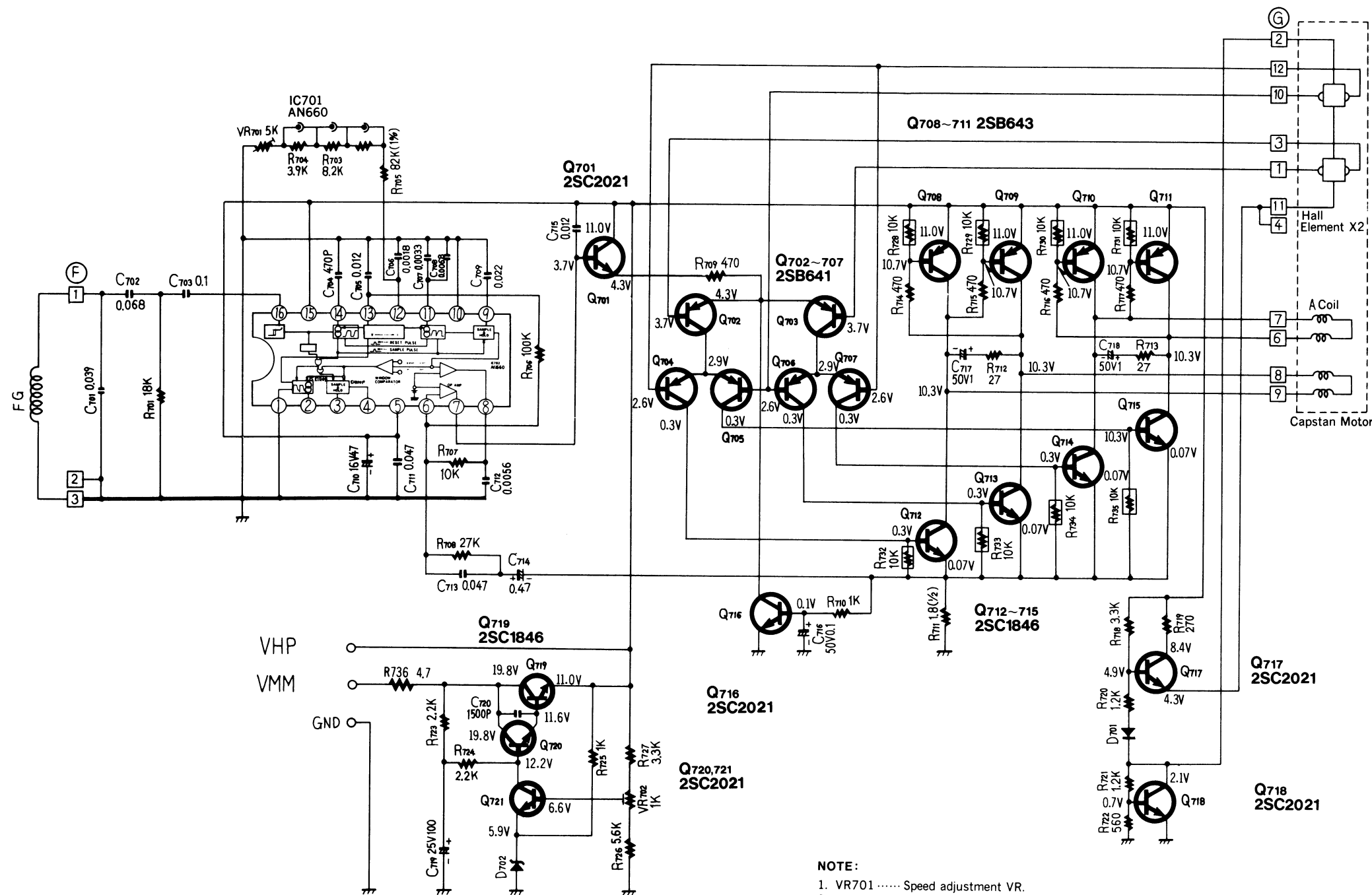


MUTING CIRCUIT BOARD

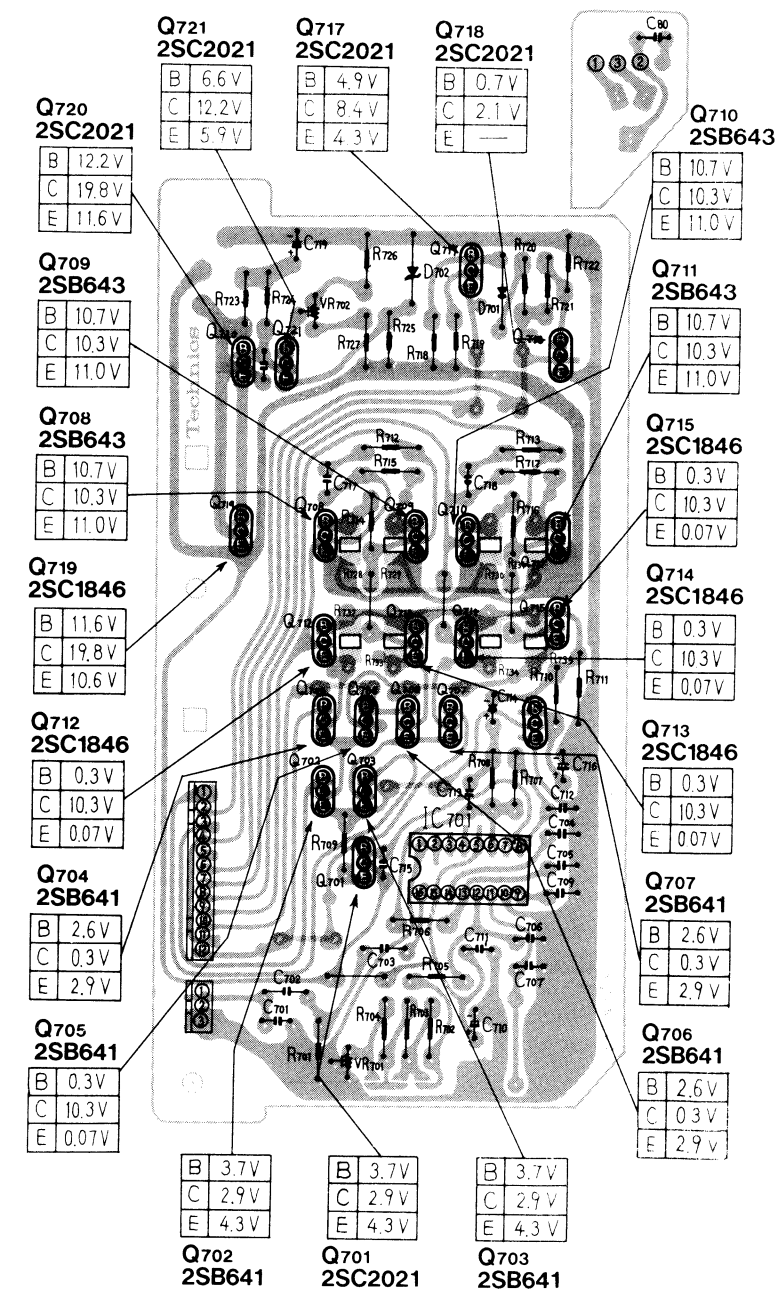


SCHEMATIC DIAGRAM

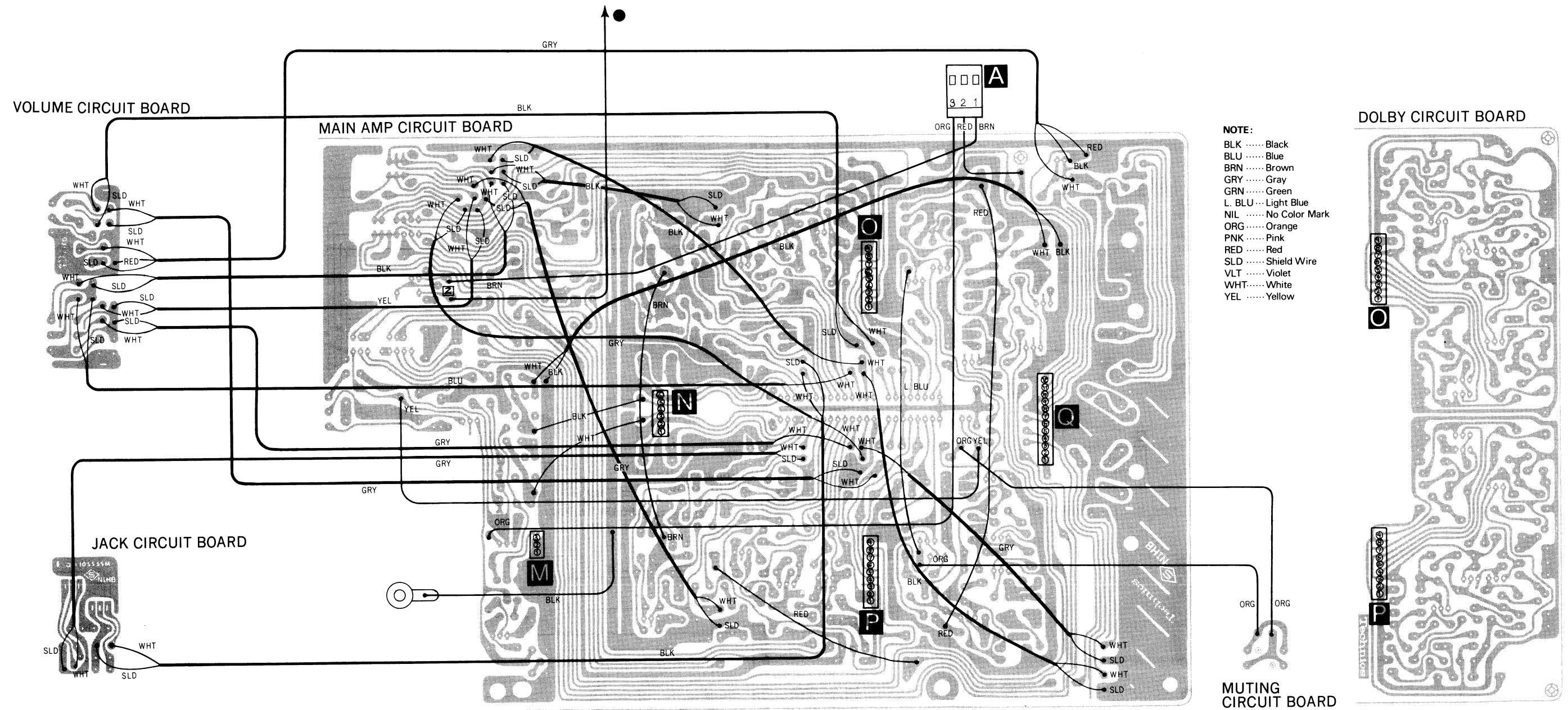
CAPSTAN DRIVING SECTION



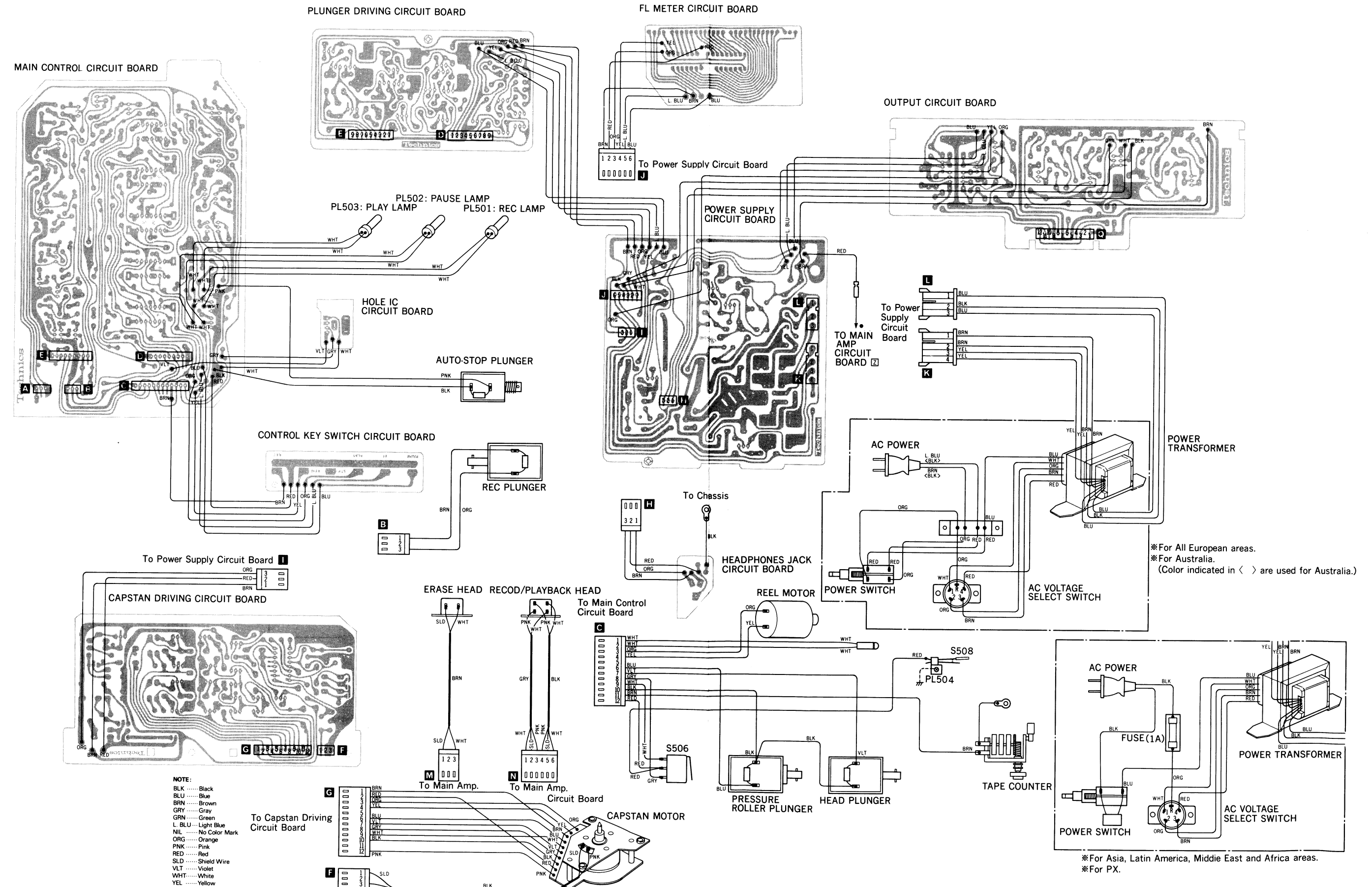
CAPSTAN DRIVING CIRCUIT BOARD



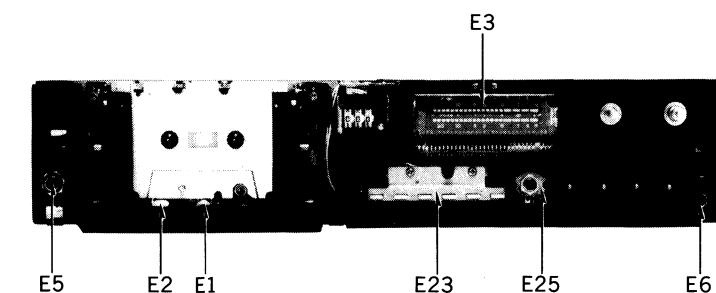
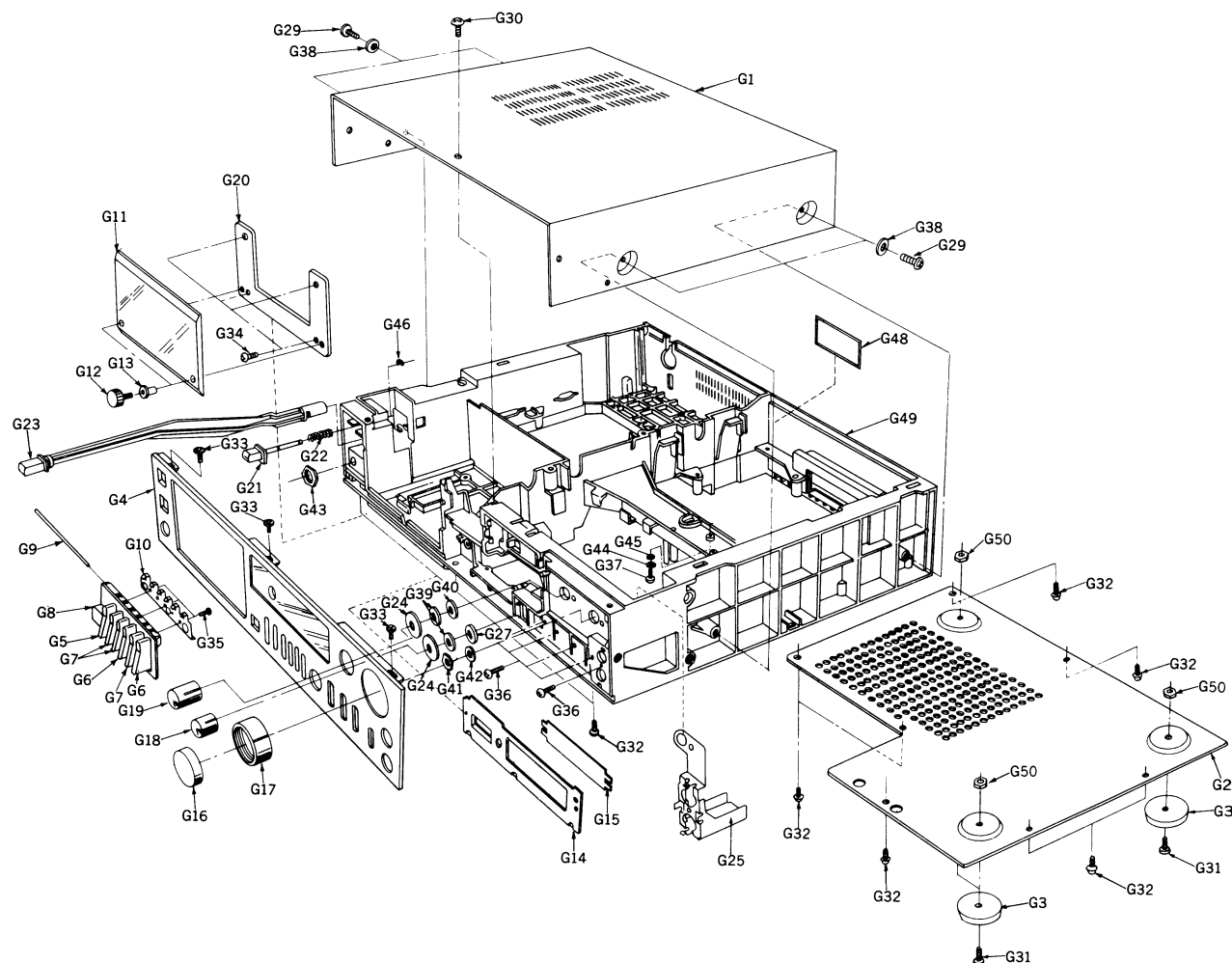
WIRING CONNECTION DIAGRAM



WIRING CONNECTION DIAGRAM



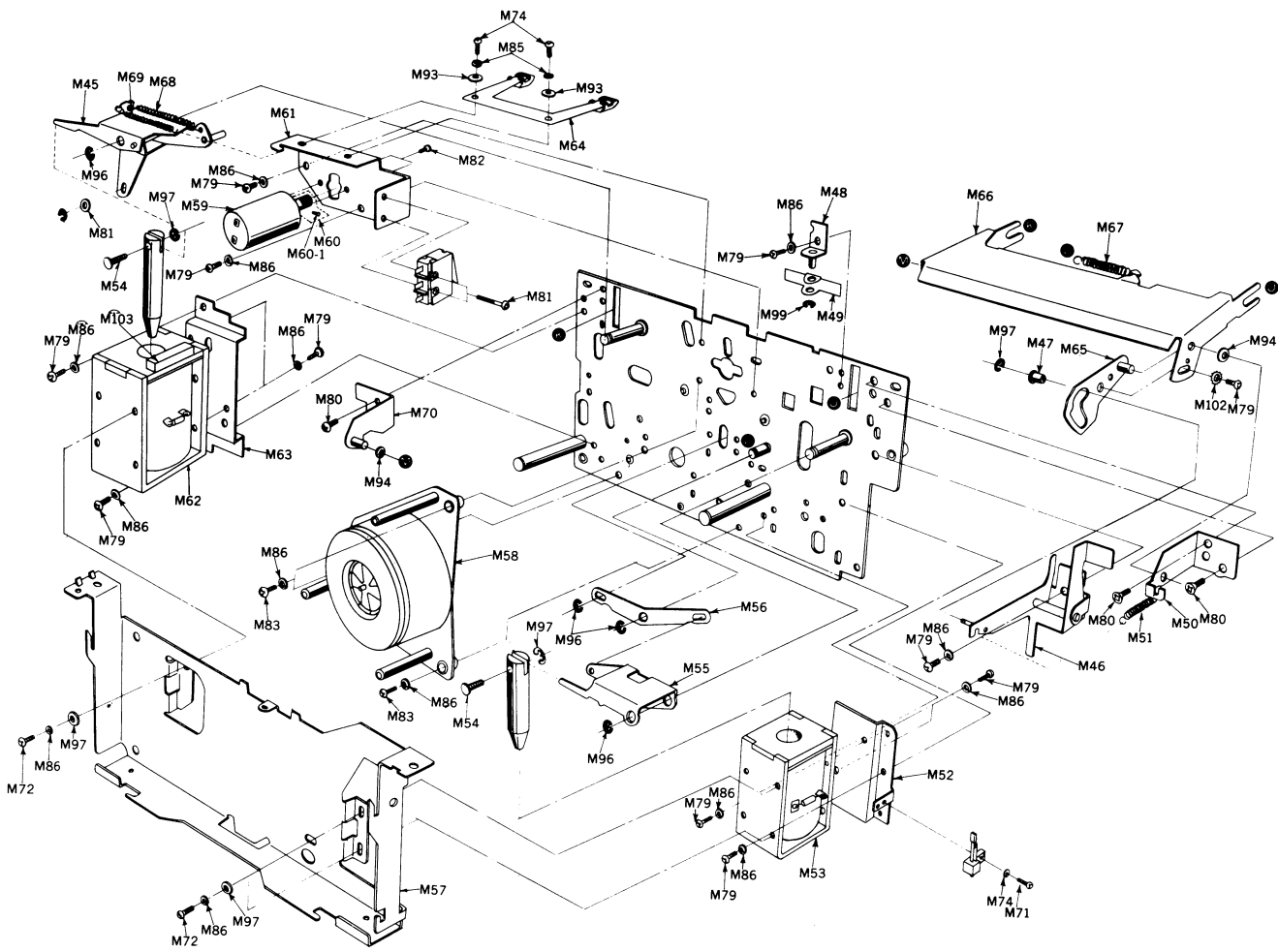
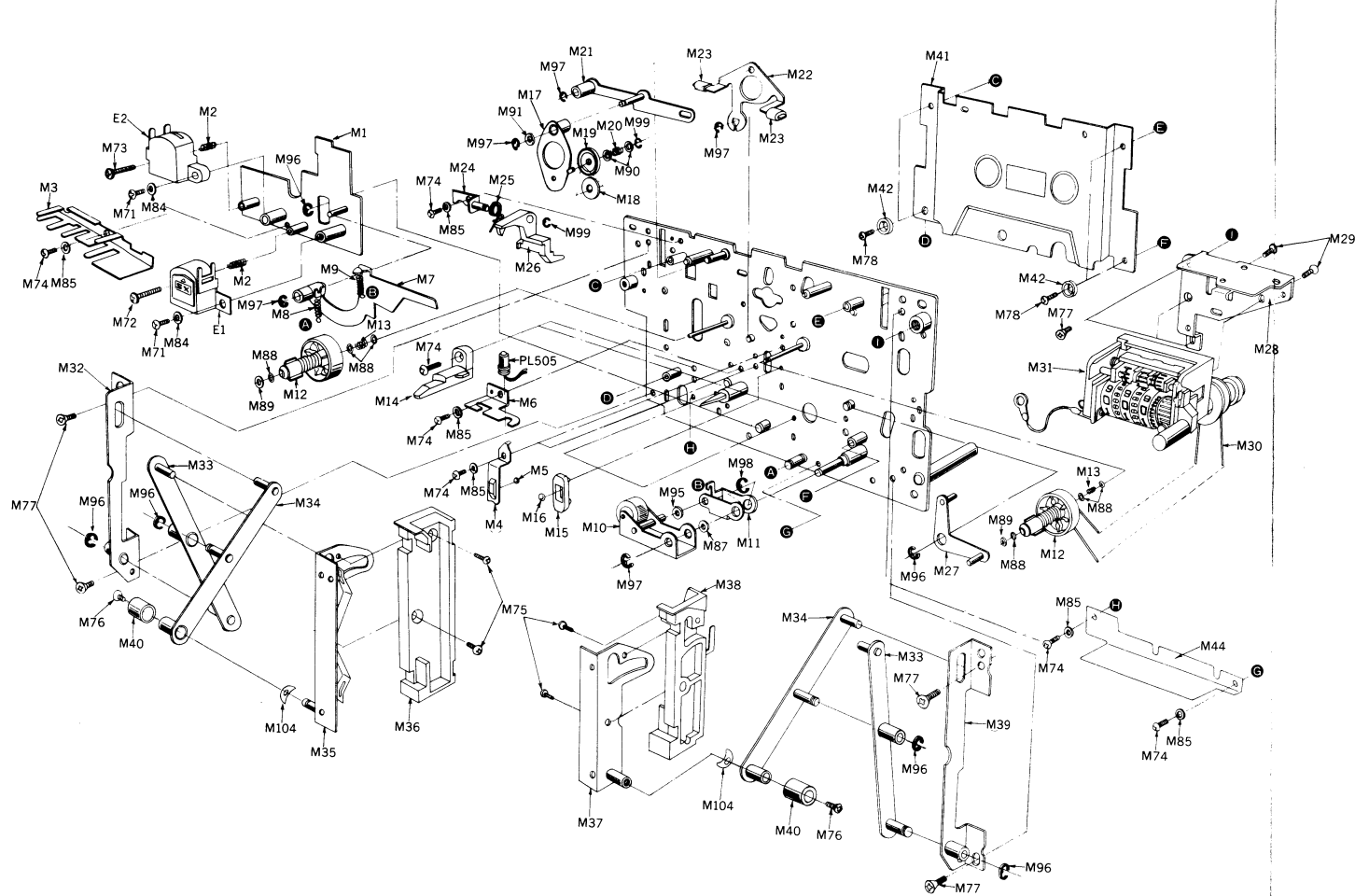
CABINET PARTS



Ref. No.	Part No.	Part Name & Description	Ref. No.	Part No.	Part Name & Description	Ref. No.	Part No.	Part Name & Description
CABINET PARTS								
G1	QGC1126K "Black Type" QGC1126 "Silver Type"	Case Cover	G20	QKG2927K "Black Type" QKG2927 "Silver Type"	Cassette Lid Holding Plate	G48	QGS2641	Main Name Plate
G2	QKS1270	Bottom Cover				*For PX		
G3	QKA1076	Rubber Foot	G21	QGO1504K "Black Type" QGO1504 "Silver Type"	Eject Button		QGS2666	"
G4	QYP0858 "Black Type" QYP0846 "Silver Type"	Front Panel Assembly				*For Asia, Latin America, Middle East and Africa areas.		
G5	QXB0528	Control Button (REC)	G23	QXB0630 "Black Type" QXB0606 "Silver Type"	Power Button Assembly		QGS2682	"
G6	QGS0529	Control Button (PLAY, PAUSE)	G24	QBJT0017	Spacer	*For United Kingdom and Australia.		
G7	QGO1416	Control Button (FF, REW, STOP)	G25	QJC0021	Earth Plate-B		QGS2683	"
G8	QGO1503	Control Button (REC MUTE)	G27	QMF2038	Mounting Plate	*For All European areas except United Kingdom.		
G9	QMN1531	Button Shaft				G49	QYM0542 "Black Type" QYM0538 "Silver Type"	Main Case
G10	QBP1831	Button Spring				G50	XNG4S	Nut
G11	QKG2922	Cassette Lid	G29	XYA4+BJ10K	Screw $\pm 4 \times 10$	ACCESSORIES		
G12	QHQ1272 "Black Type" QHQ1280 "Silver Type"	Cassette Lid Holder	G30	XSS3+8BVS "Black Type" XSS3+8BNS "Silver Type"	Screw $\pm 3 \times 8$	A1	RP023A	Connection Cord
G13	QBS1551	Cushion Rubber	G31	XTN4+10B	Tapping Screw $\pm 4 \times 10$	A2	QQT2561	Instruction Book
G14	QKJ0246 "Black Type" QKJ0313 "Silver Type"	Meter Cover-A	G32	XTN3+10B	Tapping Screw $\pm 3 \times 10$	*For PX.		
G15	QGL1130	Meter Cover-B	G33	XTN3+8B	Tapping Screw $\pm 3 \times 8$		QQT2562	"
G16	QYT0532 "Black Type" QYT0503 "Silver Type"	Volume Knob-A Assembly	*For Asia, Latin America, Middle East, Africa areas and PX.				QQT2563	"
G17	QYT0504K "Black Type" QYT0504 "Silver Type"	Volume Knob-B Assembly	G34	XSN26+4 "Black Type" XSN26+4 "Silver Type"	Screw $\pm 2.6 \times 4$	*For Asia, Latin America, Middle East and Africa areas.		
G18	QYT0467 "Black Type" QYT0506 "Silver Type"	Volume Knob-C Assembly	G35	XTN2+5B	Tapping Screw $\pm 2 \times 5$			
G19	QYT0533 "Black Type" QYT0505 "Silver Type"	Volume Knob Assembly	G36	XSN3+6S	Screw $\pm 3 \times 6$	*For PX.	QPN3826	Inside Carton
			G37	XSN3+8S	Screw $\pm 3 \times 8$			
			G38	XWA4B	Spring Washer 4 ϕ		QPN3827	"
			G39	QNQ1004	Nut	*For All European areas, Asia, Latin America, Middle East, Africa areas and Australia.		
			G40	XWS8A	Washer			
			G41	QNQ1039	Nut	P2	QPA0450	Inner Cushion-L
			G42	XWS9A	Washer	P3	QPA0451	Inner Cushion-R
			G43	QNQ1070	Nut	P4	XZB50X65A02	Poly Bag
			G44	XWA3B	Spring Washer 3 ϕ	P5	QPA0461	Spacer (Bottom Side)
			G45	XWG3	Flat Washer 3 ϕ			
			G46	XUC25FT	Stop Ring 2.5 ϕ			

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EXPLODED VIEWS



Ref. No.	Part No.	Part Name & Description	Ref. No.	Part No.	Part Name & Description	Ref. No.	Part No.	Part Name & Description	Ref. No.	Part No.	Part Name & Description	Ref. No.	Part No.	Part Name & Description
MECHANICAL PARTS			M21	QXL1164	Brake Lever Assembly	M41	QXH0277	Mechanism Cover	M61	QMA3313	Motor Angle	M83	XSN3+8S	Screw $\varnothing 3 \times 8$
M1	QXK2029	Head Base Plate Assembly	M22	QML3273	Brake	M42	QMZ1213	Spacer-B	M62	QXE0243	Plunger	M84	XWA2	Spring Washer 2 ϕ
M2	QBCA0008	Head Spring	M23	QBG1132	Stopper Rubber	M43	QBP1135	Spring Washer	M63	QMA3312	Plunger Angle-R	M85	XWA26	Spring Washer 2.6 ϕ
M3	QTD1261	Head Wires Clamper	M24	QXA0714	Detection Angle Assembly	M44	QTS1451	Mechanism Shield Plate	M64	QXH0276	Cassette Holding Cushion	M86	XWA3	Spring Washer 3 ϕ
M4	QBP1733	Steel Ball Holder-A	M25	QBN1573	Detection Lever Spring	M45	QXL1165	Lever-B Assembly	M65	QXL1173	Lock Lever Assembly	M87	QBW2016	Poly Washer
M5	QDK1012	Steel Ball 2.5 ϕ	M26	QML3285	Detection Lever	M46	QXL1188	Eject Lever Assembly	M66	QML3282	Connector Lever	M88	QBW2012	"
M6	QMA3321	Lamp Cover	M27	QXL1172	Lever-A Assembly	M47	QDP1758	Roller	M67	QBT1553	Holder Spring-R	M89	QBW2008	"
M7	QXL1168	Pressure Roller Lever Assembly	M28	QMA3588	Counter Angle	M48	QXA0713	Angle Assembly	M68	QBT1405	Lever Spring			
M8	QBT1490	Eject Lever Spring	M29	XSS3+8S	Screw $\varnothing 3 \times 8$	M49	QML3284	Release Lever	M69	QBT1713	Record Spring			
M9	QBT1441	Pressure Roller Spring	M30	QDB0215	Counter Belt-B	M50	QMA3314	Connector Angle						
M10	QXL1166	Pressure Roller Assembly												
M11	QML3267	Pressure Roller Lever-1	M31	QXA0768	Tape Counter Assembly	M51	QBT1753	Playback Lever Spring	M70	QXA0702	Connector Angle-R Assembly	M90	QBW2015	"
M12	QXD0087	Reel Table		QXA0744	"	M52	QMA3591	Plunger Angle-L	M71	XSN2+6	Screw $\varnothing 2 \times 6$	M91	QBW2017	"
M13	QBC1272	Back Tension Spring		QXA0744	"	M53	QME0141	Plunger	M72	XSN3+6S	Screw $\varnothing 3 \times 6$	M92	QBW2018	"
M14	QMG0054	Cassette Guide	M32	QXA0703	Angle-L Assembly	M54	QMN2095	Plunger Pin	M73	QHQ1230	Head Adjustment Screw	M93	XWG26	Fiber Washer
M15	QMH2009	Steel Ball Holder-B	M33	QXL1191	Link Lever-A Assembly	M55	QXL1171	Plunger Lever-L Assembly	M74	XWA2B	Washer	M94	QBW2019	Poly Washer
M16	QDK1006	Steel Ball 3 ϕ	M34	QXL1190	Link Lever-B Assembly	M56	QML3276	Plunger Lever	M75	XSN26+4BVS	Screw $\varnothing 2.6 \times 4$	M95	QBK7123	Fiber Washer
M17	QXL1189	Idler Lever Assembly	M35	QXA0706	Holder Angle-L Assembly	M57	QXA3591	Reinforcement Angle	M76	XSS2+4	Screw $\varnothing 2 \times 4$	M96	XUC3FT	Stop Ring 3 ϕ
M18	QBF1260	Idler Felt	M36	QMH2027	Cassette Holder-L	M58	QXA2121	Capstan Motor Assembly	M77	XSS3+4S	Screw $\varnothing 3 \times 4$	M97	XWG3	Fiber Washer
M19	QXI0101	Idler Assembly	M37	QXA0705	Holder Angle-R Assembly	M59	MKCN22AE5	Reel Motor	M78	QHQ1185	Step Screw	M98	XUC5FT	Stop Ring 5 ϕ
M20	QBC1308	Idler Spring	M38	QMH2028	Cassette Holder-R	M60	QXP0574	Motor Pulley Assembly	M79	XSN3+5S	Screw $\varnothing 3 \times 5$	M99	XUC2FT	Stop Ring 2 ϕ
			M39	QXA0704	Angle-R Assembly									
			M40	QKJ0245	Spacer-A	M60-1	XXE26D3FZ	Set Screw	M80	XSS3+6S	Screw $\varnothing 3 \times 6$	M100	XSN26+6	Screw $\varnothing 2.6 \times 6$
									M81	QBK7123	Washer	M101	XWG26	Flat Washer
									M82	XSN2+3	Screw $\varnothing 2 \times 3$	M102	XWC3	Lock Washer
												M103	QBG1634	Rubber Cushion

SPECIFICATIONS	
Pressure of pressure roller	400 $\pm$ 30 gr
Takeup tension (Use cassette torque meter...QZZSRKCT)	45 $\pm$ 15 gr-cm
Wow and flutter (Test tape...QZZCWAT)	Less than 0.04% (WRMS)